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(54) CLUTCH RELEASE MECHANISM

(71) We, SKF KUGELLAGERFABRIKEN GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, a German Body Corporate, of Ernst-Sachs-Strasse 2—8, 8720 Schweinfurt 2, German Federal Republic, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns a clutch release mechanism.

According to the invention a clutch release mechanism comprises a rolling bearing, the rolling bearing including an inner race ring, an outer race ring and a plurality of bodies arranged to roll on the raceways of the race rings, a release lever arranged to act on one of the race rings, and means positively to engage with the release lever and with the said one race ring or with a member integral with the said one race ring to prevent substantial relative rotation between the release lever and the said one race ring about the axis of the said one race ring, the means allowing the release lever to be freely axially displaced away from the said one race ring or member integral with the said one race ring and towards and into engagement with the said one race ring or member integral with the said one race ring.

The said one race ring may have an axially extending portion which is polygonal in cross-section with diametrically opposed surfaces being substantially parallel to each other, and the release lever may have two portions each adjacent to one of a pair of opposed surfaces of the said one race ring to prevent substantial relative rotation about the axis of the said one race ring, the release lever having a part of each one of the said portions extending axially and radially away from the said one race ring to guide the release lever and said one race ring into position relative to each other during assembly.

A plastics material may be provided integral with the said one race ring to prevent substantial relative rotation between the said one race ring and the release lever about the axis of the said one race ring. The release lever may have a substantially wedge-shaped portion, an edge of which portion is in contact with the plastics material.

The said one race ring may have a plurality of recesses arranged annularly and the release lever may have a projection engaging one of the recesses to prevent substantial relative rotation about the axis of the said one race ring.

Three embodiments of the invention will now be described by way of example, reference being made to the accompanying drawings, of which:—

Figure 1 is an axial section of one embodiment showing a rolling bearing and release lever;

Figure 2 is a view along the axis from the left of Figure 1;

Figure 3 is an axial section of another embodiment;

Figure 4 is an axial section of a further embodiment; and

Figure 5 is an axial section on the line A—A of Figure 4.

The basic construction of the rolling bearing for all three embodiments is the same, there being design differences between the top and the bottom halves of each of Figures 1, 3, 4 and 5.

The rolling bearing comprises an inner race ring 10 an outer race ring 11-both of sheet metal, a plurality of balls 12 arranged to roll on the raceways of the race rings and a plastics cage 13. The inner race ring 10 has a radially outwardly extending portion 14 and a portion 15 extending axially from portion 14 towards the clutch (not shown) and with clearance over outer race ring 11. The outer race ring 11 has a radially inwardly extending portion 16 which is concave with respect to a diaphragm spring 17, the spring having tongues which together form an annular head 18 contacting portion 16 so that the bearing is self-centring. The outer race ring 11 has a portion 19 extending axially from portion 16 through the bore of the diaphragm spring 17. A plurality of lugs 20 extend radially outwards from portion 19 to axially locate the bearing with diaphragm spring 17. In the top half of each of Figures 1, 3, 4 and 5, the bearing chamber between the

race rings 10 and 11 is sealed on the clutch side by a ring 21 which is substantially S-shaped in axial section and extends from radially outside of the inner race ring 10 axially along towards the clutch and radially inside of portion 19 of outer race ring 11. In the bottom half of Figures 1, 3, 4 and 5, the inner race ring 10 has a portion 22 extending axially towards the clutch and radially within the portion 19 to form a sealing gap therewith. In all the Figures, the side of the bearing chamber furthest from the clutch is sealed by a ring 23 located around the outer race ring 11 and extending radially inwardly towards the inner race ring 10.

Referring to Figures 1 and 2 the rolling bearing described is shown with a sheet metal release lever 30. The axially extending outer surface of portion 15 of inner race ring 10 is a polygon in cross-section having twelve sides 31, each pair of diametrically opposed surfaces being substantially parallel. The release lever 30 has two axially extending portions 32 which are substantially parallel to each other, the distance between them being slightly greater than the distance between a pair of parallel surfaces 31, so that each portion 32 is adjacent to one of a pair of opposed surfaces 31 and substantial relative rotation between the inner race ring 10 and the release lever 30 about the axis of the inner race ring is prevented. A part 33 of each portion 32 extends axially and radially outwardly away from inner race ring 10 to guide the release lever 30 and inner race ring 10 into position during assembly, the inner race ring being rotated until portion 15 engages parts 33. This enables the rolling bearing to be fitted blind without difficulty. The clutch release mechanism has a short axial dimension because the bearing is fitted into the release lever 30. This embodiment may be modified by having the polygon formed on the radially inside surface of the inner race ring 10 and the release lever 30 having portions extending into the bore of the inner race ring.

Referring to Figure 3, the portion 14 of inner race ring 10 has an integral coating of a soft plastics material 40 and a release lever 41 has a wedge-shaped portion 42, an edge of which portion is in contact with the plastics material. Initial relative rotation between portion 42 and race ring 10 about the axis of the race ring causes a mound 43 of plastics material 40 to be formed which halts further relative rotation. Preferably the plastics material 40 is a subsequently cured plastics material which cures after the mound 43 has been formed and thus sets hard to prevent further relative rotation.

Referring to the embodiment shown in Figures 4 and 5 the portion 14 of inner race ring 10 has a plurality of recesses 50 arranged annularly. A release lever 51 has one or more projections 52 each engaging one of the recesses 50 to prevent relative rotation between the inner race ring 10 and the release lever 51 about the axis of the inner race ring.

WHAT WE CLAIM IS:—

1. A clutch release mechanism comprising a rolling bearing, the rolling bearing including an inner race ring, an outer race ring and a plurality of bodies arranged to roll on the raceways of the race rings, a release lever arranged to act on one of the race rings, and means positively to engage with the release lever and with the said one race ring or with a member integral with the said one race ring to prevent substantial relative rotation between the release lever and the said one race ring about the axis of the said one race ring, the means allowing the release lever to be freely axially displaced away from the said one race ring or member integral with the said one race ring and towards and into engagement with the said one race ring or member integral with the said one race ring.

2. A mechanism as claimed in claim 1, wherein the said one race ring has an axially extending portion which is polygonal in cross-section with diametrically opposed surfaces being substantially parallel to each other, and the release lever has two portions each adjacent to one of a pair of opposed surfaces of the said one race ring to prevent substantial relative rotation about the axis of the said one race ring, the release lever having a part of each one of the said portions extending axially and radially away from the said one race ring to guide the release lever and said one race ring into position relative to each other during assembly.

3. A mechanism as claimed in claim 1, wherein a plastics material is provided integral with the said one race ring to prevent substantial relative rotation between the said one race ring and the release lever about the axis of the said one race ring.

4. A mechanism as claimed in claim 3, wherein the release lever has a substantially wedge-shaped portion, an edge of which portion is in contact with the plastics material.

5. A mechanism as claimed in claim 1, wherein the said one race ring has a plurality of recesses arranged annularly and the release lever has a projection engaging one of the recesses to prevent substantial relative rotation about the axis of the said one race ring.

6. A clutch release mechanism substantially as herein described with reference to and as shown in Figures 1 and 2, or with reference to and as shown in Figure 3, or with reference to and as shown in Figures 4 and 5 of the accompanying drawings.

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Sheet 1

FIG. 1.

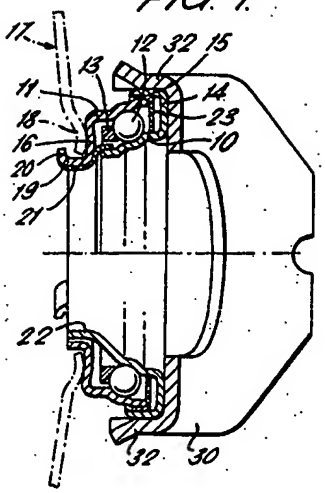


FIG. 3.

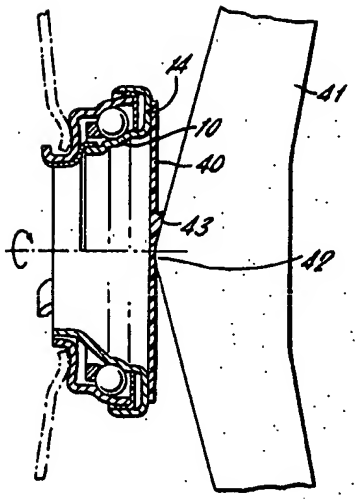


FIG. 4.

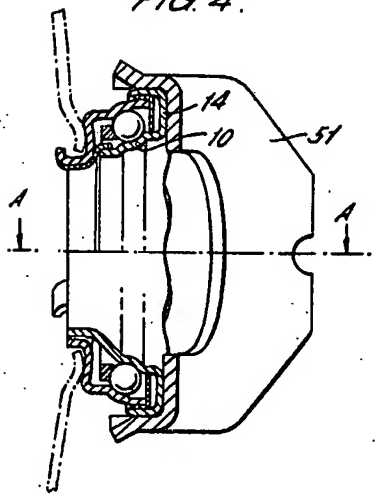
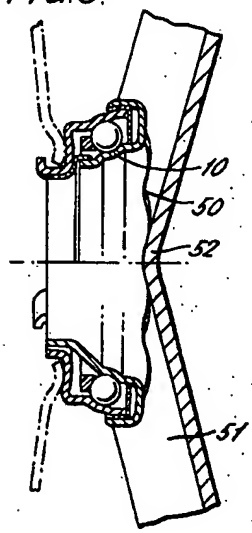


FIG. 5.



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Sheet 2

FIG. 2.